REMARKS

The Office examined claims 1-4 and rejected claims 1 and 3. With this paper, the claims are amended as described below, but none are canceled or added, and so claims 1-4 remain in the application.

Changes to the claims

The claims are changed with this paper, in ways believed not related to patentability.

Rejections under 35 USC §102

At section 2 of the Office action, claims 1 and 3 are rejected under 35 USC §102 as being anticipated by Boutros ("Signal Space Diversity: A Power- and Bandwidth-Efficient Diversity Technique for the Rayleigh Fading Channel").

Claims 1 and 3 both recite telecommunication using a signal constellation of symbols having a dimensionality that is at least four and is a multiple of two, where *each symbol corresponds to an ordered set of at least two sets of two or more numbers*, and further characterized in that for each of the at least four-dimensional symbols, *a modulator modulates the carrier signal using in turn each of the at least two sets of two or more numbers*.

Boutros teaches a transmission system as usual, but with the addition of a rotation operation to the symbol constellation in order to increase (so-called modulation) diversity (or signal space diversity). Thus, e.g. a simple 4-PSK constellation is rotated as shown in Fig. 1, with the result that the "compressed constellation" (which is how the constellation would appear in case of severe noise) still includes four distinct points (since no two points collapse together as would happen in case of the non-rotated constellation of Fig. 1a). Other than the rotation, the teaching of Boutros is that of a conventional transmission system (except

that Boutros suggests not using forward error correction coding, but instead relying only on the improvement in throughput resulting from the increase in modulation diversity caused by rotating the signal constellation). There is no teaching by Boutros of other then the usual modulation schemes; it is just that a rotated signal constellation is used, and so the demodulator must un-rotate the received symbols to ultimately recover the transmitted bits.

The assertions of the Office Action notwithstanding, applicant respectfully submits that Boutros fails to teach or suggest "a modulator modulat[ing] the carrier signal using in turn each of the at least two corresponding sets of two or more numbers," as claimed in claims 1 and 3. Instead, the Office Action asserts that Boutros discloses this feature *inherently*.

In order for a claim element to be inherently present in a reference it must be clear that the claim element is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. See MPEP § 2112 (the fact that a certain characteristic may be present in the prior art is not sufficient to establish the inherency of that characteristic). Now Boutros does not teach a new modulation scheme or process, but only a rotating of existing/conventional signal constellations, and presumably conventional modulation following the rotation, since Boutros nowhere teaches or suggests that the actual carrier modulation is anything other than the usual. In a conventional modulation scheme, sets of consecutive bits in a bit stream are mapped to symbols, sometimes considered to be complex symbols having a real part and an imaginary part, with the real part used to modulate an in-phase carrier signal and the imaginary part used to modulate a quadrature-phase carrier signal. Thus, the modulation of a carrier that would be performed according to the teaching of Boutros could be conventional modulation, and so Boutros cannot be said to inherently teach or suggest modulating a

carrier signal using in turn each of the at least two sets of two or more numbers, as in claims 1 and 3.

Further, even if it is assumed that Section II pages 1454-1455 of Boutros inherently teach what the Office Action asserts, that "the modulator would take each I and Q of the constellation and modulate with a carrier signal," this is still not what is claimed in claims 1 and 3. Claims 1 and 3 recite modulating the (same) carrier signal twice using a two-dimensional modulator. See specification page 6, lines 28-33. I and Q modulation is modulation of two quadrature carrier signals; it is not modulation of the same carrier signal twice. Boutros fails to mention modulation of the (same) carrier signal using two corresponding sets of two or more numbers in turn, as in claims 1 and 3.

Accordingly, applicant respectfully requests that the rejections under 35 USC §102 be reconsidered and withdrawn.

Conclusion

For all the foregoing reasons it is believed that all of the claims of the application are in condition for allowance and their passage to issue is earnestly solicited.

Respectfully submitted,

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